OIPE
SEP 18 2006
PATENT & TRADEMARK OFFICE

SEQUENCE LISTING

<110> Fogh, Jens
        Gellerfors, Pär

<120> PRODUCTION OF rhPBGD AND NEW THERAPEUTIC
    METHODS FOR TREATING PATIENTS WITH ACUTE INTERMITTENT
    PORPHYRIA (AIP) AND OTHER PORPHYRIC DISEASES

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<140> US 10/048,234
<141> 2003-09-11

<150> PA 1999 01071
<151> 1999-07-27

<150> PA 2000 00667
<151> 2000-04-19

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<213> Homo Sapiens

<400> 7
atgagagtga ttcgcgtggg tacccgcaag agccagcttg ctcgcataca gacggacagt  60
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5

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gtggtggcaa cattgaaagc ctcgtaccct ggcctgcagt ttgaaatcat tgctatgtcc 120
accacagggg acaagattct tgatactgca ctctctaaga ttggagagaa aagcctgttt 180
accaaggagc ttgaacatgc cctggagaag aatgaagtgg acctggttgt tcactccttg 240
aaggacctgc ccactgtgct tcctcctggc ttcaccatcg gagccatctg caagcgggaa 300
aaccctcatg atgctgttgt cttcacccaa aatttgttgg gaagaccta gaaaccctgc 360
cagagaagag tgtggtggga accagctccc tgcgaagagc agcccagctg cagagaaagt 420
tcccgcatct ggagttcagg agtattcggg gaaacctcaa cacccggctt cggaagctgg 480
acgagcagca ggagttcagt gccatcatcc tggcaacagc tggcctgcag cgcatgggct 540
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tgactggagg agtctggagt ctagacggct cagatagcat acaagagacc atgcaggcta 840
ccatccatgt ccctgcccag catgaagatg ccctgagga tgacccacag ttggtaggca 900
tcactgctcg taacattcca cgagggcccc agttggctgc ccagaacttg ggcatcagcc 960
tggccaactt gttgctgagc aaaggagcca aaaacatcct ggatgttgca cggcaattga 1020
acgatgccca ttaa                                                  1034

<210> 8
<211> 1035
<212> DNA
<213> Homo Sapiens

<400> 8
atgagagtga ttcgcgtggg tacccgcaag agccagcttg ctcgcataca gacgggcagt 60
gtggtggcaa cattgaaagc ctcgtaccct ggcctgcagt ttgaaatcat tgctatgtcc 120
accacagggg acaagattct tgatactgca ctctctaaga ttggagagaa aagcctgttt 180
accaaggagc ttgaacatgc cctggagaag aatgaagtgg acctggttgt tcactccttg 240
aaggacctgc ccactgtgct tcctcctggc ttcaccatcg gagccatctg caagcgggaa 300
aaccctcatg atgctgttgt ctttcaccca aaatttgttg ggaagaccct agaaaccctg 360
ccagagaaga gtgtggtggg aaccagctcc ctgcgaagag cagcccagct gcagagaagg 420
ttcccgcatc tggagttcag gagtattcgg ggaaacctca cacccggct cggaagctg 480
gacgagcagc aggagttcag tgtcatcatc ctggcaacag ctggcctgca gcgcatgggc 540
tggcacaacc gggttgggca gatcctgcac cctgaggaat gcatgtatgc tgtgggccag 600
ggggccttgg gcgtggaagt gcgagccaag gaccaggaca tcttggatct ggtgggtgtg 660
ctgcacgatc ccgagactct gcttcgctgc atcgctgaaa gggccttcct gaggcacctg 720
gaaggaggct gcagtgtgcc agtagccgtg catacagcta tgaaggatgg gcaactgtac 780
ctgactggag gagtctggag tctagacggc tcagatagca tacaagagac catgcaggct 840
accatccatg tccctgccca gcatgaagat ggccctgagg atgacccaca gttggtaggc 900
atcactgctc gtaacattcc acgagggccc cagttggctg cccagaactt gggcatcagc 960
ctggccaact tgttgctgag caaggagcc aaaaacatcc tggatgttgc acggcaattg 1020
aacgatgccc attaa                                                 1035

<210> 9
<211> 1035
<212> DNA
<213> Homo Sapiens

<400> 9
atgagagtga ttcgcgtggg tacccgcaag agccagcttg ctcgcataca gacggacagt 60
gtggtggcaa cattgaaagc ctcgtaccct ggcctgcagt ttgaaatcat tgctatgtcc 120
accacagggg acaagattct tgatactgca ctctctaaga ttggagagaa aagcctgttt 180
accaaggagc ttgaacatgc cctggagaag aatgaagtgg acctggttgt tcactccttg 240
aaggacctgc ccactgtgct tcctcctggc ttcaccatcg gagccatctg caagcgggaa 300
aaccctcatg atgctgttgt ctttcaccca aaatttgttg ggaagaccct agaaaccctg 360
ccagagaaga gtgtggtggg aaccagctcc ctgcgaagag cagcccagct gcagagaaag 420
ttcccgcatc tggagttcag gagtattcgg ggaaacctca cacccggct cggaagctg 480
gacgagcagc aggagttcag tgccatcatc ctggcaacag ctggcctgca gcgcatgggc 540
tggcacaacc gggtggggca gatcctgcac cctgaggaat gcatgtatgc tgtgggccag 600
```

```
ggggccttgg gcgtggaagt gcgagccaag gaccaggaca tcttggatct ggtgggtgtg 660
ctgcacgatc ccgagactct gcttcgctgc atcgctgaaa gggccttcct gaggcacctg 720
gaaggaggtt gcagtgtgcc agtagccgtg catacagcta tgaaggatgg gcaactgtac 780
ctgactggag gagtctggag tctagacggc tcagatagca tacaagagac catgcaggct 840
accatccatg tccctgccca gcatgaagat ggccctgagg atgacccaca gttggtaggc 900
atcactgctc gtaacattcc acgagggccc cagttggctg cccagaactt gggcatcagc 960
ctggccaact tgttgctgag caaaggagcc aaaaacatcc tggatgttgc acggcaattg 1020
aacgatgccc attaa                                                  1035
```

```
<210> 10
<211> 1034
<212> DNA
<213> Homo Sapiens
```

```
<400> 10
atgagagtga ttcgcgtggg tacccgcaag agccagcttg ctcgcataca gacggacagt 60
gtggtggcaa cattgaaagc ctcgtaccct ggcctgcagt ttgaaatcat tgctatgtcc 120
accacagggg acaagattct tgatactgca ctctctaaga ttggagagaa aagcctgttt 180
accaaggagc ttgaacatgc cctggagaag aatgaagtgg acctggttgt tcactccttg 240
aaggacctgc ccactgtgct tcctcctggc ttcaccatcg gagccatctg caagcgggaa 300
aaccctcatg atgctgttgt ctttcaccca aaatttgttg ggaagaccct agaaaccctg 360
ccagagaaga gtgtggtggg aaccagctcc ctgcgaagag cagcccagct gcagagaaag 420
ttcccgcatc tggagttcag gagtattcgg ggaaacctca cacccggct cggaagctg 480
gacgagcagc aggagttcag tgccatcatc ctggcaacag ctggcctgca gcgcatgggc 540
tggcacaacc gggtggggca gatcctgcac cctgaggaat gcatgtatgc tgtgggccag 600
ggggccttgg gcgtggaagt gcgagccaag gaccaggaca tcttggatct ggtgggtgtg 660
ctgcacgatc ccgagactct gcttcgctgc atcgctgaaa gggccttcct gaggcacctg 720
gaaggaggct gcagtgtgcc agtagccgtg catacagcta tgaaggatgg gcaactgtac 780
ctgactggag gagtctggag tctagacggc tcagatagca tacaagagac catgcaggct 840
accatccatg tccctgccca gcatgaagat ggccctgagg atgacccaca gttggtaggc 900
atcactgctc gtaacattcc acgagggccc cagttggctg cccagaactt gggcatcagc 960
ctggccaact tgttgctgag caaaggagcc aaaaacatcc tggatgttgc acggcaatta 1020
acgatgccca ttaa                                                    1034
```

```
<210> 11
<211> 1035
<212> DNA
<213> Homo Sapiens
```

```
<400> 11
atgagagtga ttcgcgtggg tacccgcaag agccagcttg ctcgcataca gacggacagt 60
gtggtggcaa cattgaaagc ctcgtaccct ggcctgcagt ttgaaatcat tgctatgtcc 120
accacagggg acaagattct tgatactgca ctctctaaga ttggagagaa aagcctgttt 180
accaaggagc ttgaacatgc cctggagaag aatgaagtgg acctggttgt tcactccttg 240
aaggacctgc ccactgtgct tcctcctggc ttcaccatcg gagccatctg caagcgggaa 300
aaccctcatg atgctgttgt ctttcaccca aaatttgttg ggaagaccct agaaaccctg 360
ccagagaaga gtgtggtggg aaccagctcc ctgcgaagag cagcccagct gcagagaaag 420
ttcccgcatc tggagttcag gagtattcgg ggaaacctca cacccggct cggaagctg 480
gacgagcagc aggagttcag tgccatcatc ctggcaacag ctggcctgca gcgcatgggc 540
tggcacaacc gggtggggca gatcctgcac cctgaggaat gcatgtatgc tgtgggccag 600
ggggccttgg gcgtggaagt gcgagccaag gaccaggaca tcttggatct ggtgggtgtg 660
ctgcacgatc ccgagactct gcttcgctgc atcgctgaaa gggccttcct gaggcacctg 720
gaaggaggct gcagtgtgcc agtagccgtg catacagcta tgaaggatgg gcaactgtac 780
ctgactggag gagtctggag tctagacggc tcagatagca tacaagagac catgcaggcc 840
accatccatg tccctaccca gcatgaagat ggccctgagg atgacccaca gttggtaggc 900
atcactgctc gtaacattcc acgagggccc cagttggctg cccagaactt gggcatcagc 960
ctggccaact tgttgctgag caaaggagcc aaaaacatcc tggatgttgc acggcaattg 1020
aacgatgccc attaa                                                  1035
```

<210> 12
<211> 3986
<212> DNA
<213> Homo Sapiens

<400> 12
cacctgacgc gccctgtagc ggcgcattaa gcgcggcggg tgtggtggtt acgcgcagcg 60
tgaccgctac acttgccagc gccctagcgc ccgctccttt cgctttcttc ccttcctttc 120
tcgccacgtt cgccggcttt ccccgtcaag ctctaaatcg ggggctccct ttagggttcc 180
gatttagtgc tttacggcac ctcgacccca aaaaacttga ttagggtgat ggttcacgta 240
gtgggccatc gccctgatag acggtttttc gccctttgac gttggagtcc acgttcttta 300
atagtggact cttgttccaa actggaacaa cactcaaccc tatctcggtc tattcttttg 360
atttataagg gattttgccg atttcggcct attggttaaa aaatgagctg atttaacaaa 420
aatttaacgc gaattttaac aaaatattaa cgcttacaat ttccattcgc cattcaggct 480
gcgcaactgt tgggaagggc gatcggtgcg ggcctcttcg ctattacgcc agctggcgaa 540
agggggatgt gctgcaaggc gattaagttg ggtaacgcca gggttttccc agtcacgacg 600
ttgtaaaacg acggccagtg aattgtaata cgactcacta tagggcgaat gggtaccgg 660
gcccccctc gaggtcgacg gtatcgataa gcttattaat gggcatcgtt caattgccgt 720
gcaacatcca ggatgttttt ggctcctttg ctcagcaaca agttggccag ctgatgccc 780
aagttctggg cagccaactg gggccctcgt ggaatgttac gagcagtgat gcctaccaac 840
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caaaccaccg ctggtagcgg tggttttttt gtttgcaagc agcagattac gcgcagaaaa 2820
aaaggatctc aagaagatcc tttgatcttt tctacggggt ctgacgctca gtggaacgaa 2880
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agttaccaat gcttaatcag tgaggcacct atctcagcga tctgtctatt tcgttcatcc 3060
atagttgcct gactccccgt cgtgtagata actacgatac gggagggctt accatctggc 3120
cccagtgctg caatgatacc gcgagaccca cgctcaccgg ctccagattt atcagcaata 3180

8

```
aaccagccag ccggaagggc cgagcgcaga agtggtcctg caactttatc cgcctccatc 3240
cagtctatta attgttgccg ggaagctaga gtaagtagtt cgccagttaa tagtttgcgc 3300
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ggttattgtc tcatgagcgg atacatattt gaatgtattt agaaaaataa acaaataggg 3960
gttccgcgca catttccccg aaaagt                                       3986
```

```
<210> 13
<211> 1260
<212> DNA
<213> Homo Sapiens
```

```
<400> 13
cacaggaaac agctatgacc atgattacgc caagctcgaa attaaccctc actaaaggga 60
acaaaagctg gagctccacc gcggtggcgg ccgctctaga actagtggat cccccgggct 120
gcaggaattc atgagagtga ttcgcgtggg tacccgcaag agccagcttg ctcgcataca 180
gacggacagt gtggtggcaa cattgaaagc ctcgtaccct ggcctgcagt ttgaaatcat 240
tgctatgtcc accacagggg acaagattct tgatactgca ctctctaaga ttggagagaa 300
aagcctgttt accaaggagc ttgaacatgc cctggagaag aatgaagtgg acctggttgt 360
tcactccttg aaggacctgc ccactgtgct tcctcctggc ttcaccatcg agccatctg 420
caagcgggaa aaccctcatg atgctgttgt cttcacccca aaatttgttg ggaagaccct 480
agaaaccctg ccagagaaga gtgtggtggg aaccagctcc ctgcgaagag cagcccagct 540
gcagagaaag ttcccgcatc tggagttcag gagtattcgg ggaaacctca cacccggct 600
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tgtgggccag ggggccttgg gcgtggaagt gcgagccaag gaccaggaca tcttggatct 780
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gggcatcagc ctggccaact tgttgctgag caaaggagcc aaaaacatcc tggatgttgc 1140
acggcaattg aacgatgccc attaataagc ttatcgatac cgtcgacctc gagggggggc 1200
ccggtaccca attcgcccta tagtgagtcg tattacaatt cactggccgt cgttttacaa 1260
```

```
<210> 14
<211> 32
<212> DNA
<213> Homo Sapiens
```

```
<400> 14
atccatgaat ccacgcaat gcagccccag tc                                   32
```

```
<210> 15
<211> 32
<212> DNA
<213> Homo Sapiens
```

```
<400> 15
agtcgtaagc ttgcctggca ctgtcctcca tc                                  32
```

```
<210> 16
<211> 22
<212> DNA
<213> Homo Sapiens

<400> 16
gtaatacgac tcactatagg gc                                        22

<210> 17
<211> 22
<212> DNA
<213> Homo Sapiens

<400> 17
ctaaagggaa caaaagctgg ag                                        22

<210> 18
<211> 20
<212> DNA
<213> Homo Sapiens

<400> 18
gcgcgtaata cgactcacta                                           20

<210> 19
<211> 20
<212> DNA
<213> Homo Sapiens

<400> 19
cctacgctgt gtcttgatct                                           20

<210> 20
<211> 20
<212> DNA
<213> Homo Sapiens

<400> 20
ggcttcacca tgagcatgtc                                           20

<210> 21
<211> 993
<212> DNA
<213> Homo Sapiens

<400> 21
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acagccacca ccaccctcaa tgcctccaac ctcatctacc ccatctttgt cacggatgtt 120
cctgatgaca tacagcctat caccagcctc ccaggagtgg ccaggtatgg tgtgaagcgg 180
ctggaagaga tgctgaggcc cttggtggaa gagggcctac gctgtgtctt gatctttggc 240
gtccccagca gagttcccaa ggacgagcgg ggttccgcag ctgactccga ggagtcccca 300
gctattgagg caatccatct gttgaggaag accttcccca acctcctggt ggcctgtgat 360
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ttccgggctg aggagagccg ccagcggctg gctgaggtgg cattggcgta tgccaaggca 480
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gcttcctgtt tctatggccc tttccgggat gcagctaagt caagcccagc ttttggggac 660
cgccgctgct accagctgcc ccctggagca cgaggcctgg ctctccgagc tgtggaccgg 720
```

10

```
gatgtacggg aaggagctga catgctcatg gtgaagccgg gaatgcccta cctggacatc 780
gtgcgggagg taaaggacaa gcaccctgac ctccctctcg ccgtgtacca cgtctctgga 840
gagtttgcca tgctgtggca tggagcccag gccggggcat ttgatctcaa ggctgccgta 900
ctggaggcca tgactgcctt ccgcagagca ggtgctgaca tcatcatcac ctactacaca 960
ccgcagctgc tgcagtggct gaaggaggaa tga                              993
```

<210> 22
<211> 330
<212> PRT
<213> Homo Sapiens

<400> 22

```
Met Gln Pro Gln Ser Val Leu His Ser Gly Tyr Phe His Pro Leu Leu
 1               5                  10                  15
Arg Ala Trp Gln Thr Ala Thr Thr Thr Leu Asn Ala Ser Asn Leu Ile
            20                  25                  30
Tyr Pro Ile Phe Val Thr Asp Val Pro Asp Asp Ile Gln Pro Ile Thr
        35                  40                  45
Ser Leu Pro Gly Val Ala Arg Tyr Gly Val Lys Arg Leu Glu Glu Met
    50                  55                  60
Leu Arg Pro Leu Val Glu Glu Gly Leu Arg Cys Val Leu Ile Phe Gly
65                  70                  75                  80
Val Pro Ser Arg Val Pro Lys Asp Glu Arg Gly Ser Ala Ala Asp Ser
                85                  90                  95
Glu Glu Ser Pro Ala Ile Glu Ala Ile His Leu Leu Arg Lys Thr Phe
            100                 105                 110
Pro Asn Leu Leu Val Ala Cys Asp Val Cys Leu Cys Pro Tyr Thr Ser
            115                 120                 125
His Gly His Cys Gly Leu Leu Ser Glu Asn Gly Ala Phe Arg Ala Glu
    130                 135                 140
Glu Ser Arg Gln Arg Leu Ala Glu Val Ala Leu Ala Tyr Ala Lys Ala
145                 150                 155                 160
Gly Cys Gln Val Val Ala Pro Ser Asp Met Met Asp Gly Arg Val Glu
                165                 170                 175
Ala Ile Lys Glu Ala Leu Met Ala His Gly Leu Gly Asn Arg Val Ser
            180                 185                 190
Val Met Ser Tyr Ser Ala Lys Phe Ala Ser Cys Phe Tyr Gly Pro Phe
            195                 200                 205
Arg Asp Ala Ala Lys Ser Ser Pro Ala Phe Gly Asp Arg Arg Cys Tyr
    210                 215                 220
Gln Leu Pro Pro Gly Ala Arg Gly Leu Ala Leu Arg Ala Val Asp Arg
225                 230                 235                 240
Asp Val Arg Glu Gly Ala Asp Met Leu Met Val Lys Pro Gly Met Pro
                245                 250                 255
Tyr Leu Asp Ile Val Arg Glu Val Lys Asp Lys His Pro Asp Leu Pro
            260                 265                 270
Leu Ala Val Tyr His Val Ser Gly Glu Phe Ala Met Leu Trp His Gly
        275                 280                 285
Ala Gln Ala Gly Ala Phe Asp Leu Lys Ala Ala Val Leu Glu Ala Met
    290                 295                 300
Thr Ala Phe Arg Arg Ala Gly Ala Asp Ile Ile Ile Thr Tyr Tyr Thr
305                 310                 315                 320
Pro Gln Leu Leu Gln Trp Leu Lys Glu Glu
                325                 330
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<210> 23
<211> 32
<212> DNA

11

<213> Artificial Sequence

<220>
<223> Oligonucleotide primer for amplification

<400> 23
cgtggaattc atgagagtga ttcgcgtggg ta   32

<210> 24
<211> 47
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer for amplification

<400> 24
ggagaagctt attaatggcg atcgttcaat tgccgtgcaa catccag   47

<210> 25
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer for amplification

<400> 25
tcgcctccct ctagtctctg   20

<210> 26
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer for amplification

<400> 26
cagcaggagt tcagtgccat c   21

<210> 27
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer for amplification

<400> 27
gatggcactg aactcctgct g   21

<210> 28
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer for amplification

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<400> 28
cagcaaccca ggcatctgtg                                              20

<210> 29
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer for amplification

<400> 29
gtaatacgac tcactatagg gc                                           22

<210> 30
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer for sequencing

<400> 30
ctaaagggaa caaaagctgg a                                            21

<210> 31
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer for sequencing

<400> 31
cagctatgac catgattacg c                                            21

<210> 32
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Expression plasmid partial sequence

<400> 32
aattctaaca taagttaagg aggaaaaaaa aatgagagtt attcgtgtcg gtac        54

<210> 33
<211> 7
<212> PRT
<213> Homo Sapiens

<400> 33
Met Arg Val Ile Arg Val Gly
 1               5

<210> 34
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<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for PCR amplification

<400> 34
atccatgaat tccacgcaat gcagccccag tc   32

<210> 35
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for PCR amplification

<400> 35
agtcgtaagc ttgcctggca ctgtcctcca tc   32

<210> 36
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for PCR amplification

<400> 36
gtaatacgac tcactatagg gc   22

<210> 37
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for PCR amplification

<400> 37
ctaaagggaa caaaagctgg ag   22

<210> 38
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for PCR amplification

<400> 38
gcgcgtaata cgactcacta   20

<210> 39
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for PCR amplification

<400> 39
cctacgctgt gtcttgatct   20

<210> 40
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for PCR amplification

<400> 40
ggcttcacca tgagcatgtc   20

<210> 41
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for PCR amplification

<400> 41
ggagtcatgt ccggtaacgg   20

<210> 42
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for PCR amplification

<400> 42
cagaccagtt agcgcacatc   20

<210> 43
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for PCR amplification

<400> 43
cgcggggtcg acgccaccat gtccggtaac ggcggc   36

<210> 44
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer for PCR amplification

<400> 44

15

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cccggggggta ccttagcgca catcattaag                                    30

<210> 45
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonuclotide primer for plasmid construction

<400> 45
aattctaaca taagttaagg aggaaaaaaa aatgagagtt attcgtgtcg g             51

<210> 46
<211> 46
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonuclotide primer for plasmid construction

<400> 46
cgacacgaat aactctcatt tttttttcct ccttaactta tgttag                  46

<210> 47
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonuclotide primer for plasmid construction

<400> 47
gatcactcat gtttgacagc ttatcatcga tt                                 32

<210> 48
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonuclotide primer for plasmid construction

<400> 48
agctaatcga tgataagcgt caaacatgag t                                  31

<210> 49
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonuclotide primer for plasmid construction

<400> 49
agtcagaatt cagacgcacg gcggtacgat aa                                 32

<210> 50
<211> 32
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<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonuclotide primer for plasmid construction

<400> 50
attcactcga ggtcaccatc ggtaccagtt ca   32

<210> 51
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonuclotide primer for plasmid construction

<400> 51
agatcaagct tcggccagac gcaggttatc ta   32

<210> 52
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonuclotide primer for amplification

<400> 52
atacactcga gaccggcatg agtatccttg tcac   34

<210> 53
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonuclotide primer for amplification

<400> 53
actgacctcg agcggcacgt aagaggttcc   30

<210> 54
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonuclotide primer for amplification

<400> 54
actgaactcg agaattacgc cccgccctg   29

<210> 55
<211> 20
<212> PRT
<213> Homo Sapiens

<400> 55

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Met Ser Gly Asn Gly Asn Ala Ala Ala Thr Ala Glu Glu Asn Ser Pro
 1               5                   10                  15
Lys Met Arg Val
            20
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<210> 56
<211> 60
<212> DNA
<213> Homo Sapiens

<400> 56
atgtctggta acggcattgc ggctgcaacg gcggaagaaa acagcccaaa gatgagagtg 60

<210> 57
<211> 25
<212> DNA
<213> Homo Sapiens

<400> 57
agcgcatggg ctggcacaac cgggt   25

<210> 58
<211> 9
<212> PRT
<213> Homo Sapiens

<400> 58
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Gln Arg Met Gly Trp His Asn Arg Val
 1               5
```

<210> 59
<211> 25
<212> DNA
<213> Homo Sapiens

<400> 59
agcgcatggg ctagcacaac cgggt   25

<210> 60
<211> 25
<212> DNA
<213> Homo Sapiens

<400> 60
agcgcatggg ctagcacaac cgggt   25

<210> 61
<211> 68
<212> DNA
<213> Artificial Sequence

<220>
<223> Chimeric oligonucleotide for chimeroplasty gene
      repair

<400> 61

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agcgcatggg ctggcacaac cgggttttta cccggttgtg ccagcccatg cgctccgggt 60
tttcccgg                                                           68
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<210> 62
<211> 25
<212> DNA
<213> Homo Sapiens

<400> 62
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acccggttgt gctagcccat gcgct                                         25
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